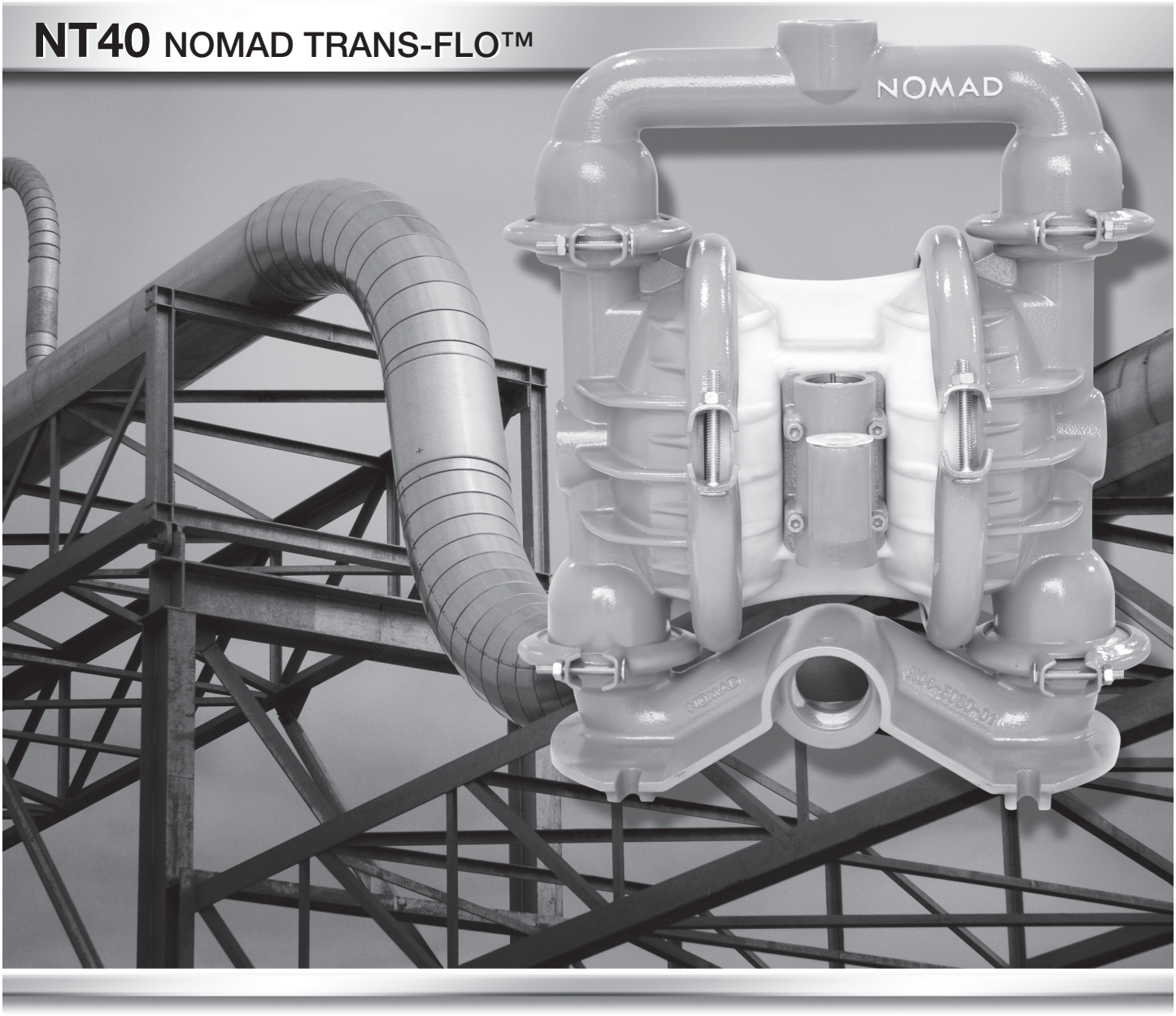
NOMAD
NO BOUNDARIES

NOMAD™

OPERATION MANUAL

NT40 NOMAD TRANS-FLO™



AIR-OPERATED DOUBLE DIAPHRAGM PUMPS

JDA GLOBAL™

A JDA Global Company

8/11 rev. 1

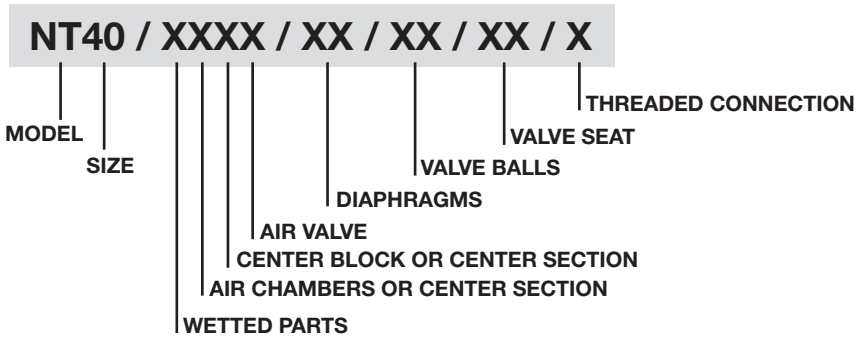
CAUTION – SAFETY POINTS

TEMPERATURE LIMITS:		
Neoprene	-17.8°C to 93.3°C	0°F to 200°F
Buna-N	-12.2°C to 82.2°C	10°F to 180°F
EPDM	-51.1°C to 137.8°C	-60°F to 280°F
Viton®	-40°C to 176.7°C	-40°F to 350°F
Santoprene®	-40°C to 107.2°C	-40°F to 225°F
Polyurethane	12.2°C to 65.6°C	10°F to 150°F
Hytrel®	-28.9°C to 104.4°C	-20°F to 220°F
PTFE	4.4°C to 104.4°C	40°F to 220°F

1. Review the NOMAD Chemical Field Guide for all applications. The information provided is the "best thinking available" regarding chemical compatibility. The guide however, does not provide a recommendation.
2. Always wear safety glasses during pump operation. A diaphragm rupture may force liquid to exit via air exhaust.
3. When handling flammable fluids, prevent static sparking by properly grounding the pump.
4. Do not exceed 125 psig (8.6 bar).
5. Prior to maintenance, compressed air line should be disconnected to allow air pressure to bleed from pump.
6. Tighten all clamp bands and hardware parts prior to installation. Fittings may loosen during transportation.

PUMP DESIGNATION SYSTEM

38 mm (1 – 1/2") Pump
Maximum Flow Rate:
307 lpm (81 gpm)



MATERIAL CODES

MODEL
NT40 = 38MM (1 – 1/2")

WETTED PARTS & OUTER PISTON
AA = ALUMINUM / ALUMINUM

AIR CHAMBERS
P = POLYPROPYLENE (CENTER SECTION)

CENTER BLOCK
P = POLYPROPYLENE

AIR VALVE
B = BRASS

DIAPHRAGMS
BN = BUNA-N (Red Dot)
ND = EPDM (Blue Dot)
NE = NEOPRENE (Green Dot)
TF = PTFE W/BUNA BACK-UP (White)

VALVE BALL
BN = BUNA-N (Red Dot)
ND = EPDM (Blue Dot)
NE = NEOPRENE (Green Dot)
TF = PTFE (White)

VALVE SEAT
A = ALUMINUM*
BN = BUNA-N (Red Dot)
ND = EPDM (Blue Dot)
NE = NEOPRENE (Green Dot)
*Valve seat o-ring required.

VALVE SEAT O-RING
TF = PTFE (White)

AIR OPERATED DOUBLE DIAPHRAGM PUMPS FUNCTIONALITY AND FLOW PATTERN

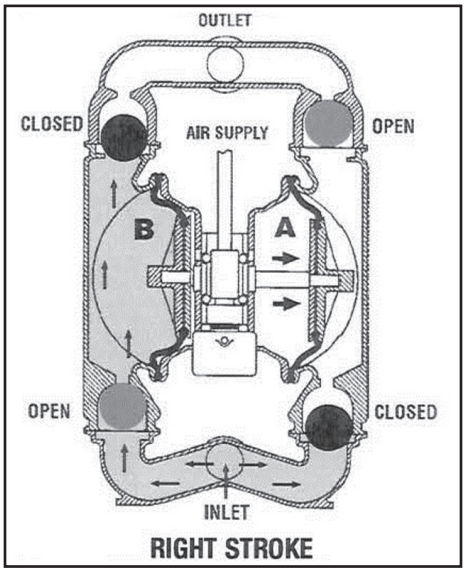


Figure 1: Air valve directs pressurized air to the back side of diaphragm A. Compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber (see shaded area).

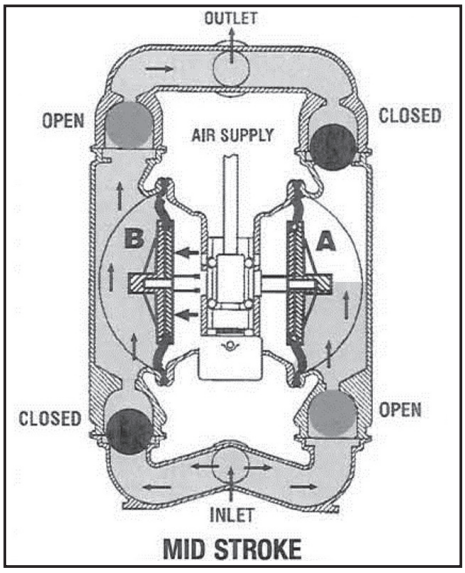


Figure 2: When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of the diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. These same hydraulic forces lift the discharge valve ball off its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.

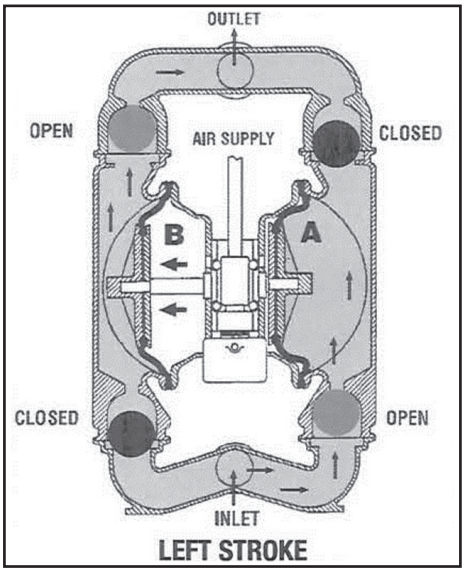
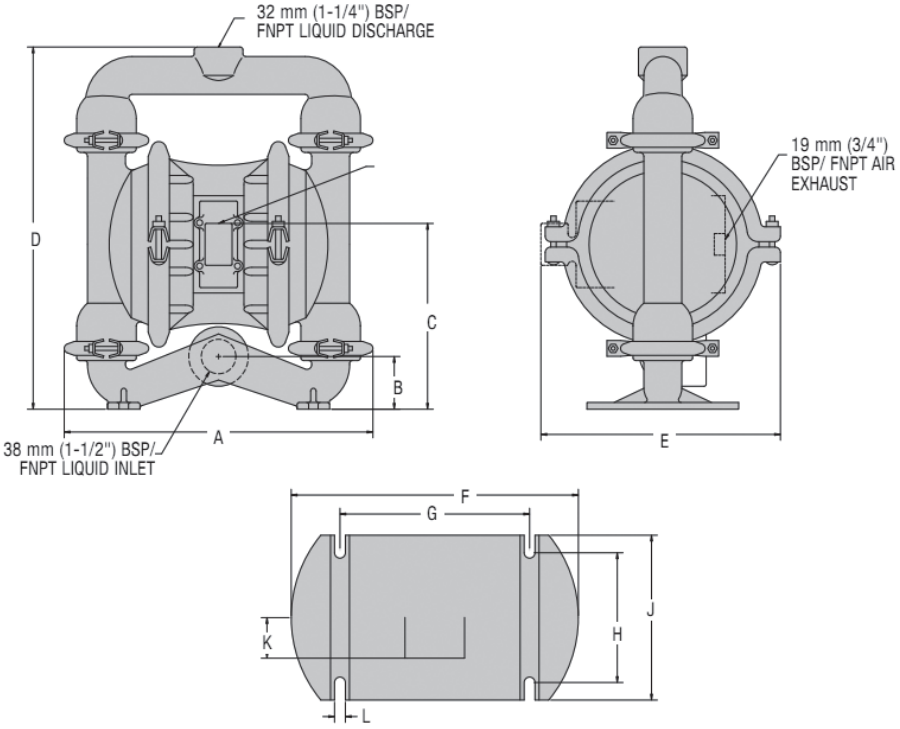


Figure 3: At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

DIMENSIONAL DRAWINGS



DIMENSIONS

ITEM	METRIC (mm)	STANDARD (inch)
A	391	15.4
B	63	2.5
C	219	8.6
D	442	17.4
E	285	11.2
F	338	13.3
G	224	8.8
H	152	6.0
J	193	7.6
K	67	2.6
L	11	0.4

BSP threads available.

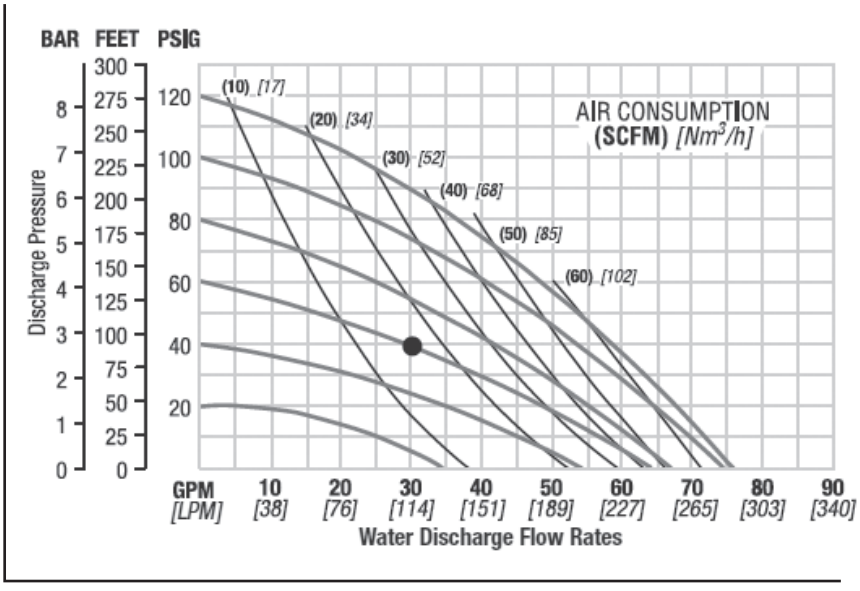
PERFORMANCE
NT40 METAL
RUBBER-FITTED

Height..... 442 mm (17.4")
Width..... 391 mm (15.4")
Depth ..... 285 mm (11.2")
Est. Ship Weight..... Aluminum 17 kg (38 lbs)
Air Inlet..... 13 mm (1/2")
Inlet..... 38 mm (1-1/2")
Outlet ..... 32 mm (1-1/4")
Suction Lift ..... 5.49 m Dry (18')
8.53 m Wet (28')
Displacement/Stroke ..... 1.02 l (0.27 gal.) [1]
Max. Flow Rate..... 288 lpm (76 gpm)
Max. Size Solids..... 4.8 mm (3/16")

[1]Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2 bar (30 psig) head pressure.

Example: To pump 113.6 lpm (30 gpm) against a discharge pressure head of 2.7 bar (40 psig) requires 4.1 bar (60 psig) and 25.5 Nm^3/h (15 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 8.6 bar (125 psig) air supply pressure.



Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

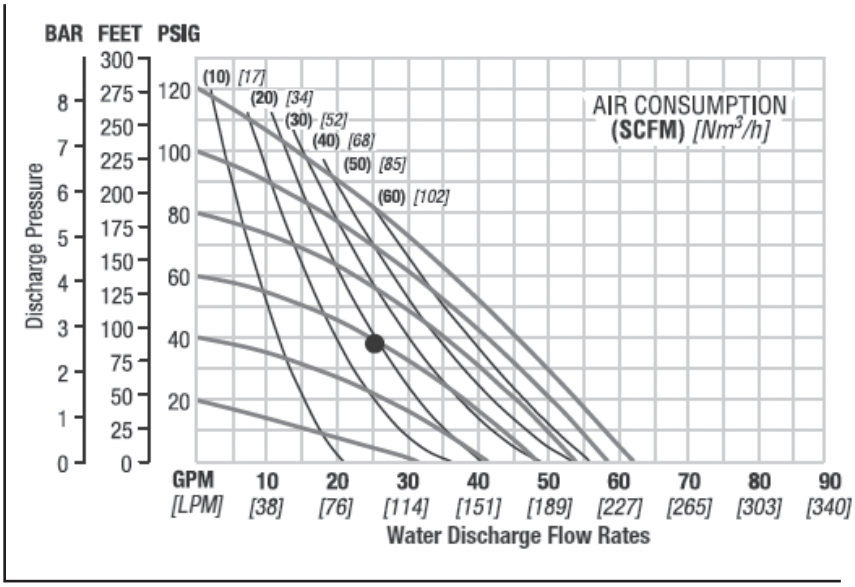
PERFORMANCE
NT40 METAL
PTFE-FITTED

Height.....442 mm (17.4")
Width.....391 mm (15.4")
Depth .....285 mm (11.2")
Est. Ship Weight.....Aluminum 17 kg (38 lbs)
Air Inlet.....13 mm (1/2")
Inlet..... 38 mm (1-1/2")
Outlet ..... 32 mm (1-1/4")
Suction Lift ..... 2.74 m Dry (9')
8.53 m Wet (28')
Displacement/Stroke ..... 0.53 l (0.14 gal.) [1]
Max. Flow Rate..... 235 lpm (62 gpm)
Max. Size Solids.....4.8 mm (3/16")

[1]Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2 bar (30 psig) head pressure.

Example: To pump 94.6 lpm (25 gpm) against a discharge pressure head of 2.7 bar (40 psig) requires 4.1 bar (60 psig) and 51 Nm^3/h (30 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 8.6 bar (125 psig) air supply pressure.



Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SUGGESTED INSTALLATION

The suction pipe size should be at least 38mm (1 – 1/2") diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the NT40 is capable of pulling a high vacuum. Discharge piping should be at least 32mm (1 – 1/4"); larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

Every pump location should have an air line large enough to supply the volume of air necessary to achieve the desired pumping rate.

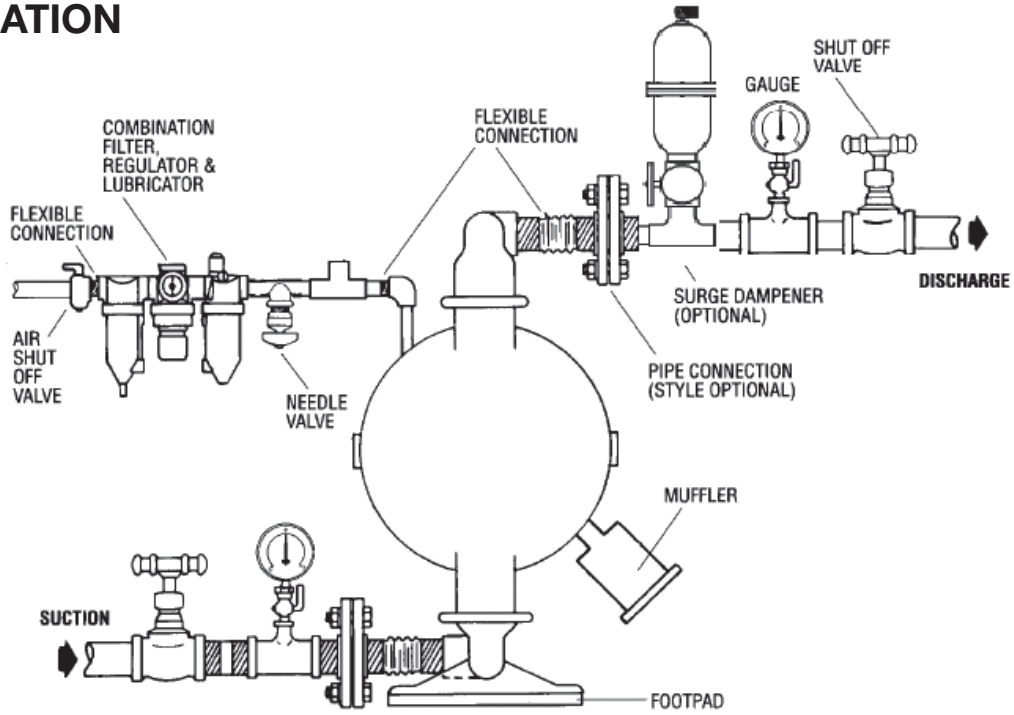
Unnecessary elbows, bends and fittings should be avoided. Pipe sizes should be selected so as to keep friction losses within practical limits. All piping should be supported independently of the pump.

Expansion joints can be installed to aid in absorbing the forces created by the natural reciprocating action of the pump. Flexible connections between the pump and rigid piping will also assist in minimizing pump vibration. A surge suppressor should be installed to protect the pump, piping and gauges from surges and water hammer.

When pumps are installed in applications involving flooded suction or suction head pressures, a gate valve should be installed in the suction line to permit closing of the line for pump service.

The NT40 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

SUGGESTED INSTALLATION



Note: In the event of a power failure, the shutoff valve should be closed, if the restarting of the pump is not desirable once power is regained.

TROUBLESHOOTING

Pump will not run or runs slowly.

1. Check air inlet screen and air filter for debris.
2. Check for sticking air valve, flush air valve in solvent.
3. Check for worn out air valve. If piston face in air valve is shiny instead of dull, air valve is worn beyond working tolerances and must be replaced.
4. Check center block rings. If worn excessively, they will not seal and air will simply flow through pump and out air exhaust.
5. Check type of lubricant being used. ISO 15-5 wt. recommended.

Pump runs but little or no product flows.

1. Check for pump cavitation; slow pump speed down to match thickness of material being pumped.
2. Check for sticking ball valves. If material being pumped is not compatible with pump elastomers, swelling may occur.
3. Make sure all suction connections are air tight.

Pump air valve freezes.

Check for excessive moisture in compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check for tightness for clamp bands, especially at intake manifold.

Product comes out air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

Pump rattles.

Create false discharge head or suction lift.

DISASSEMBLY/REASSEMBLY

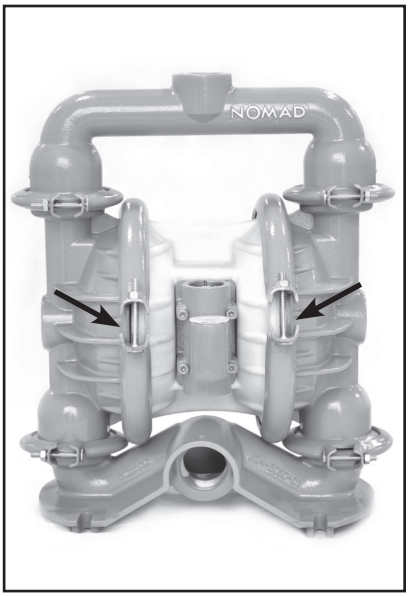
Tools Required:

Adjustable Wrench

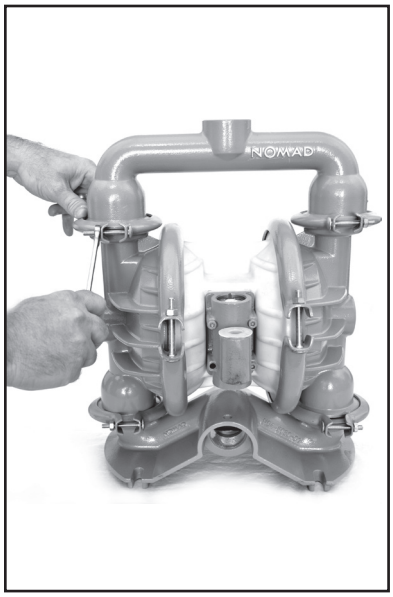
13mm (1/2") Wrench

10mm (3/8") Box Wrench

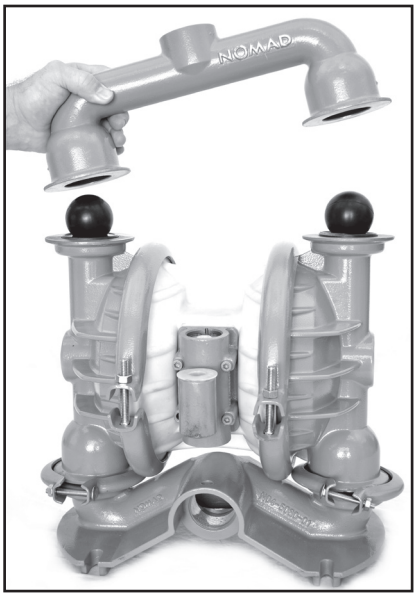
5mm (3/16") Allen Wrench



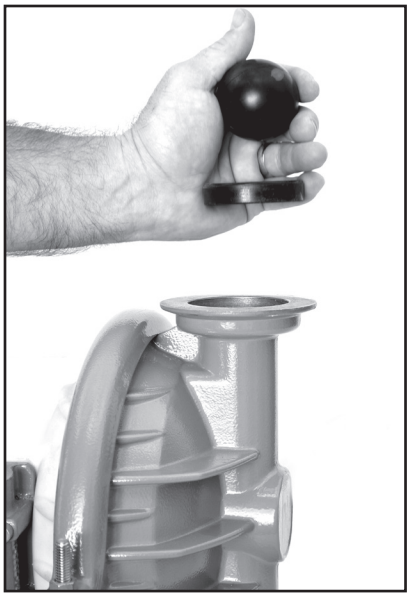
Step 1: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.



Step 2: Utilizing the 13 mm (1/2") wrench, remove the two small clamp bands that fasten the discharge manifold to the liquid chambers.



Step 3: Remove the discharge manifold to expose the valve balls and seats.



Step 4: Inspect the ball cage area of the manifold for excessive wear or damage. Remove the discharge valve balls, seats and/or o-rings from the discharge manifold and inspect for nicks, gouges, chemical attack or abrasive wear.

Step 5: Remove the two small clamp bands that fasten the intake manifold to the liquid chambers. Lift the intake manifold away to expose the valve balls and seats. Inspect intake valve ball cage for excessive wear or damage. Remove the intake valve balls, seats and/or o-rings from the discharge manifold and inspect for nicks, gouges, chemical attack or abrasive wear.

Step 6: Use 13mm wrench (1/2") to remove one set of large clamp bands which secure on liquid chamber to the center section.

Step 7: Lift liquid chamber away from center section to expose diaphragm and outer piston.

Step 8: Using an adjustable wrench, or by rotating the diaphragm by hand, remove the diaphragm assembly.

DISASSEMBLY/REASSEMBLY

Step 9: NOTE: Due to varying torque values, one of the following two conditions may occur: 1) The outer piston, diaphragm and inner piston remain attached to the shaft and the entire assembly can be removed from the center section. 2) The outer piston, diaphragm and inner piston separate from the shaft which remains connected to the opposite side diaphragm assembly. Repeat disassembly instructions for opposite liquid chamber. Inspect diaphragm assembly and shaft for signs of wear or chemical attack. Use a socket wrench to disassemble the diaphragm assembly if replacement is necessary.

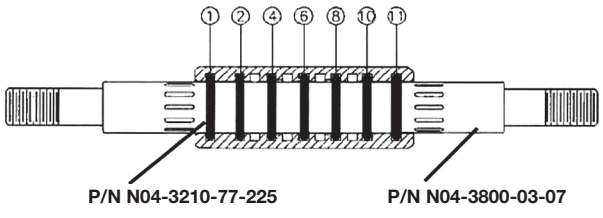
Step 10: To remove diaphragm assembly from shaft, secure shaft with soft jaws. Using an adjustable wrench, remove diaphragm assembly from shaft.

CENTER BLOCK/SEAL DISASSEMBLY

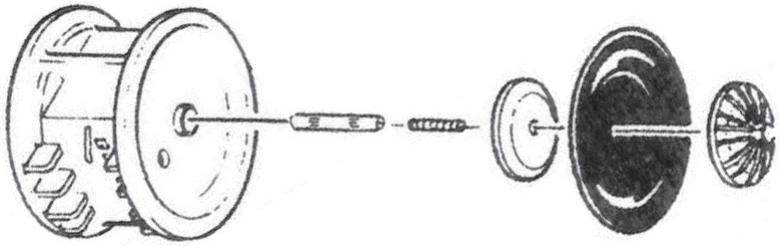
Center Block Assembly:

The pump's center block consists of a polypropylene or aluminum housing with a cast-in bronze bushing. The bushing has eleven grooves cut on the inside diameter. There are seven TRACKER™ seals that fit in these grooves. Since these TRACKER™ seals form a part of the shifting function of the pump, it is necessary that they be located in the proper grooves. When bushing wear becomes excessive, a new center block must be used.

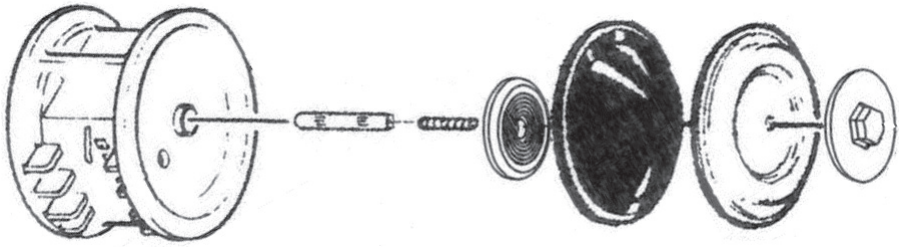
Grooves in bushing which contain TRACKER™ seals



EXPLODED VIEW (RUBBER DIAPHRAGMS)



EXPLODED VIEW (PTFE DIAPHRAGMS)



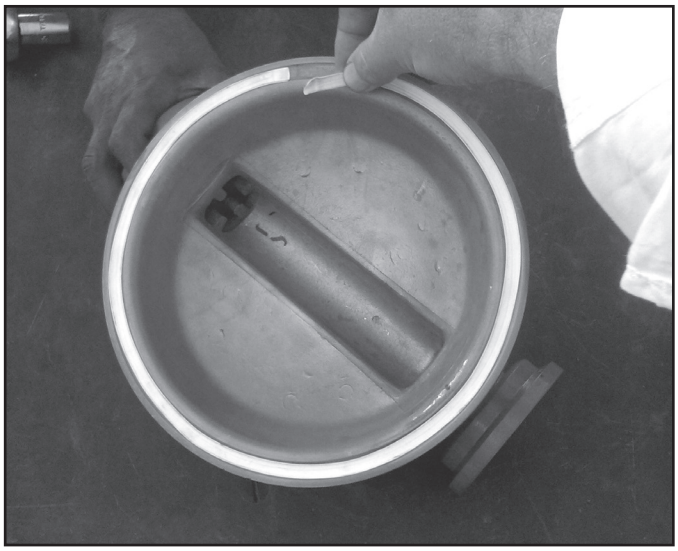
GASKET KIT INSTALLATION

NT40 pumps come standard with expanded PTFE Gasket Kits (P/N N04-9500-99). Carefully prepare sealing surfaces by removing all debris and foreign matter from diaphragm bead and all mating surfaces. If necessary, smooth or deburr all sealing surfaces. Mating surfaces must be properly aligned in order to ensure positive sealing characteristics.

Step 1: Gently remove the adhesive covering from the back of the PTFE tape. Ensure that the adhesive strip remains attached to the PTFE tape.

Step 2: Starting at any point, place the PTFE tape in the center of the diaphragm bead groove on the liquid chamber and press lightly on the tape to ensure that the adhesive holds it in place during assembly. Do not stretch the tape during placement in center of diaphragm bead groove.

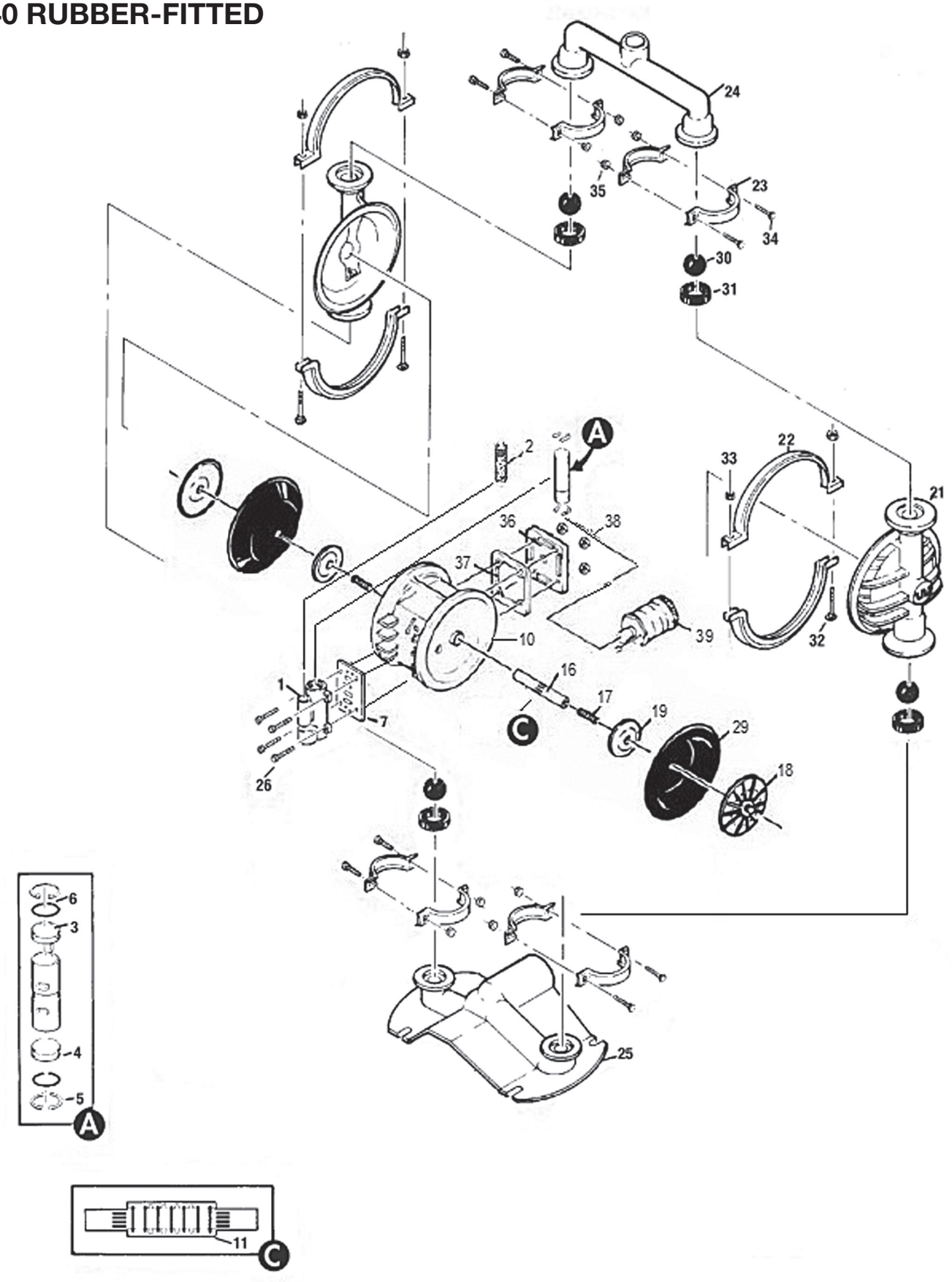
Step 3: The ends of the tape should overlap approximately 13 mm (1/2"). Proceed to install the PTFE tape on the remaining liquid chamber.



NT40 RUBBER-FITTED

Item	Description	Qty.	Part Number
1	Air Valve Assembly	1	N04-2000-07
2	Air Valve Screen	1	N04-2500-07
3	Air Valve End Cap w/ Guide (Top)	1	N04-2300-23
4	Air Valve End Cap w/out Guide (Bottom)	1	N04-2330-23
5	Air Valve Snap Ring	2	N04-2650-03
6	Air Valve Cap O-ring	2	N04-2390-52
7	Air Valve Gasket	1	N04-2600-52
10	Center Section	1	N04-3150-20-225
11	Center Block TRACKER™ Seal	7	N04-3210-77-225
16	Shaft	1	N04-3800-03-07
17	Shaft Stud	2	N04-6150-08
18	Outer Piston	2	N04-4552-01
19	Inner Piston	2	N04-3700-01
21	Liquid Chamber	2	N04-5000-01
22	Clamp Band (Large)	2	N04-7330-08
23	Clamp Band (Small)	4	N04-7100-08
24	Discharge Manifold	1	N04-5020-01
25	Inlet Manifold	1	N04-5080-01
26	Air Valve Cap Screw 1/4" - 20 x 2"	4	N04-6000-08
29	Diaphragm - Neoprene	2	N04-1010-51
30	Valve Ball - Neoprene	4	N04-1080-51
31	Valve Seat - Neoprene	4	N04-1120-51
32	Large Clamp Band Bolt 5/16"	4	N04-6070-08
33	Large Hex Nut 5/16" - 18	4	N04-6420-08
34	Small Clamp Band Bolt 1/4" -20 x 1-3/4"	8	N04-6050-08
35	Small Hex Nut 1/4" - 20	8	N04-6400-08
36	Muffler Plate	1	N04-3180-20
37	Muffler Plate Gasket	1	N04-3500-52
38	Air Valve Hex Nut 1/4"-20	4	N04-6400-08
39	Muffler	1	N04-3510-99

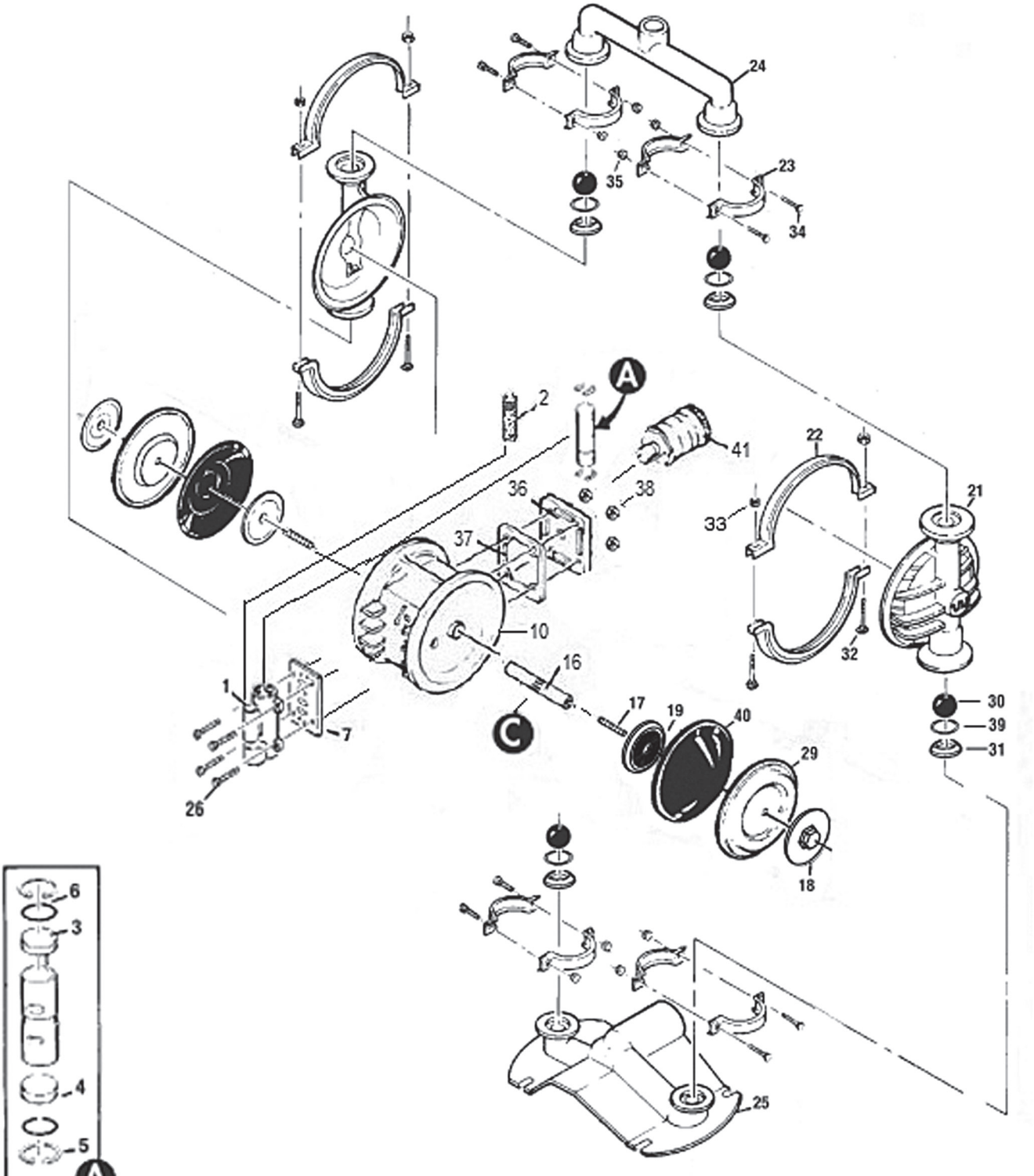
NT40 RUBBER-FITTED



NT40 PTFE-FITTED

Item	Description	Qty.	Part Number
1	Air Valve Assembly	1	N04-2000-07
2	Air Valve Screen	1	N04-2500-07
3	Air Valve End Cap w/ Guide (Top)	1	N04-2300-23
4	Air Valve End Cap w/out Guide (Bottom)	1	N04-2330-23
5	Air Valve Snap Ring	2	N04-2650-03
6	Air Valve Cap O-ring	2	N04-2390-52
7	Air Valve Gasket	1	N04-2600-52
10	Center Section	1	N04-3150-20-225
11	Center Block TRACKER™ Seal	7	N04-3210-77-225
16	Shaft	1	N04-3820-03-07
17	Shaft Stud	2	N04-6152-08
18	Outer Piston	2	N04-4600-01
19	Inner Piston	2	N04-3750-01
21	Liquid Chamber	2	N04-5000-01
22	Large Clamp Band	2	N04-7330-08
23	Small Clamp Band Assembly	4	N04-7100-08
24	Discharge Manifold	1	N04-5020-01
25	Inlet Manifold	1	N04-5080-01
26	Air Valve Cap Screw 1/4"-20 x 6-11/16"	4	N04-6000-08
29	Diaphragm	2	N04-1010-55
30	Valve Ball	4	N04-1080-55
31	Valve Seat	4	N04-1121-01
32	Large Clamp Band Bolt 5/16"-18 x 2-1/4"	4	N04-6070-08
33	Large Hex Nut 5/16" - 18	4	N04-6420-08
34	Small Clamp Band Bolt 1/4" -20 x 1-3/4"	8	N04-6050-08
35	Small Hex Nut 1/4" - 20	8	N04-6400-08
36	Muffler Plate	1	N04-3180-20
37	Muffler Plate Gasket	1	N04-3500-52
38	Air Valve Hex Nut 1/4"-20	4	N04-6400-08
39	PTFE Valve Seat O-Ring	4	N04-1200-55
40	Back-up Diaphragm	2	N04-1060-52
41	Muffler	1	N04-3510-99

NT40 PTFE-FITTED



A JDA Global Company

1351 Park Ave., Suite 104
Redlands, CA USA 92373
(909) 798-9532

NOMAD™

NO BOUNDARIES™